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regret that I did not ascertain. On a similar occasion (May 1849) the distance from one cusp to the other was found by M. Mädler, making use of the Dorpat refractor, to be no less than 240° (*Astronomische Nachrichten*, No. 679), whence he deduces 43′ 7″ as the amount of horizontal refraction in *Venus*, or greater than that of our atmosphere by about one-sixth.

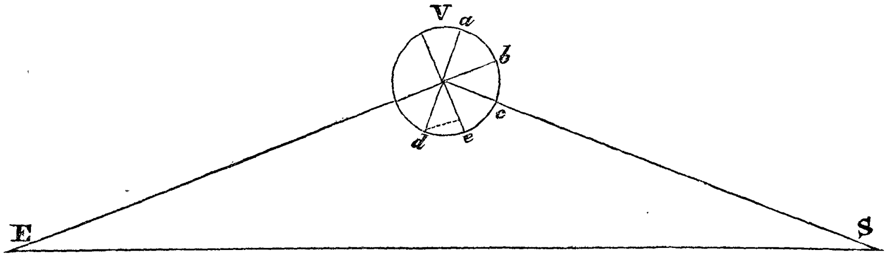
"With the object of ascertaining how much of the breadth of the crescent was due to refraction, I calculated the breadth of that portion of her surface which only would be visible, supposing the planet was not surrounded by an atmosphere, and found it to be 0″·67. The difference between this and 3″ is, I apprehend, caused by the refraction of the planet's atmosphere.

"I subjoin the calculation and a drawing of the appearance of the planet at the instant of her inferior conjunction.

	°	′	″
Heliocentric latitude of Venus	3	22	32
Geocentric latitude	8	48	10
Illuminated portion = the sum	12	10	42

"The versed sine of this last quantity is ·0225: hence ·01125 of her diameter (59″·6) = 0″·67 will be the breadth at the widest part of the illuminated crescent.

"The observations were taken at my observatory, Southampton, with a 5-foot refractor by Dollond.



"Let V be *Venus*; E the Earth; S the Sun; *ad* the boundary of light and darkness; *de* the illuminated portion, as seen from E = *bc*; but *bc* = ∠E + ∠S = geocentric lat. + heliocentric lat."

Contribution to the Theory of Elliptic Functions. By Carl John Malmsten, Professor of Mathematics in the University of Uppsala.[*]

In this paper the author gives a new demonstration of the three well-known relations connecting the elliptic function of the third order

$$\Pi(n, k, \varphi) = \int_0^{\varphi} \frac{d\varphi}{(1 + n\sin^2\varphi)\,\Delta(k, \varphi)}$$

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[*] Communicated by A. D. Wackerbarth, Esq.

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with those of the first and second order

$$F(k, \varphi) = \int_0^{\varphi} \frac{d\varphi}{\Delta(k, \varphi)}$$

$$E(k, \varphi) = \int_0^{\varphi} \Delta(k, \varphi)\, d\varphi$$

The author remarks that Lagrange established the relations between these functions by a process mainly founded on the differentiation of the parameter n; but he shows that the same object may be effected, independently of the differentiation of n, by means of the differential equation of the second order which is satisfied by $F(k, \varphi)$ and $E(k, \varphi)$.

Elements of Euphrosyne. By M. Winnecke.

Epoch, Sept. 1·0, M. T. Berlin.

$M = 299^\circ\ 0'\ 3''\!\cdot\!4$

$\pi = 95\ 13\ 45\cdot1$ } Mean Equinox,

$☊ = 31\ 11\ 59\cdot9$ } 1855·0

$i = 26\ 53\ 26\cdot0$

$\varphi = 13\ 15\ 46\cdot2$

$\mu = 622\cdot091$

$\text{Log}\ a = 0\cdot504102$

These elements are calculated from the Washington observation of September 2, and the Berlin observations of October 1 and 31.

Elements of Pomona. By M. Bruhns.

Epoch, 1854, Nov. 0·0, M. T. Berlin.

$M = 206^\circ\ 32'\ 27''\!\cdot\!6$

$\pi = 195\ 46\ 56\cdot0$ } Mean Equinox,

$☊ = 220\ 44\ 20\cdot5$ } 1855·0

$i = 5\ 39\ 2\cdot9$

$\varphi = 5\ 29\ 27\cdot6$

$\mu = 853\cdot694$

$\text{Log}\ a = 0\cdot412470$

These elements are calculated from the Paris observation of October 28, and the Berlin observations of November 6 and 14.

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